

## Econ. 1A. Chapter 10. Finance, Saving (S) and Investment (I)

### Financial Institutions and Financial Markets

1. Financial institutions and markets play a crucial role in the economy, because they provide the channels through which saving (S) flow to finance the investment (I) in new capital ( $\Delta K$ ) that make the economy grow.
2. To study the economics of financial institutions and markets, we first distinguish between
  - (a) **Finance and Money**; and (b) **Physical capital and Financial capital**.

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3. **Finance** is the lending and borrowing that moves **funds** from savers to spenders.
4. **Money** is the object (or objectives) that people use to make payments.
 

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5. **Physical capital** (K) is the tools, instruments, machines, building, and other items that have been produced in the past and that are used today to produce goods and services.
6. **Financial capital** is the funds that firms or households use to buy physical capital.
- Note that** (1) economists use the term “capital”, they mean “physical capital”; and (2)  $K \uparrow \rightarrow Y \uparrow \ \& \ w \uparrow, L \uparrow \rightarrow Y/L \uparrow$ , i.e., the standard of living rises.
 

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7. There are two important concepts in macroeconomics: (i) a flow is a quantity per unit of time and (ii) a stock is a quantity that exists at a given point of time.
8. There are two important macroeconomic stocks: (i) **capital** (K) and (ii) **wealth** (A).
9. Two flows change **the stock of capital (K)**: (i) **net investment (I)** and (ii) **depreciation**.
  - (a) **Gross investment** is the total amount spent on adding to the stock of capital (net investment) and on replacing depreciated capital.
  - (b) **Depreciation** is the decrease in the value of capital from wear & tear.
  - (c) **Net investment (I)** is the amount by which the value of capital increase. That is net investment (I) = gross investment – depreciation. Note that  $\Delta K = I$ .
10. **Wealth (A)** is the value of all the things that people own and that yield or have potential for yielding income. **Income (Y)** is the amount that people receive during a given time period from supplying the services of resources they own. People’s income (flow) is dependent upon the wealth (stock) that they own.
11. **Savings (S)** is the amount of income that is not paid in taxes or spent on consumption goods and services. It adds to wealth, i.e.,  $\Delta A = S$ .
12. To make Y grow, saving (S) and wealth (A) must be transformed into investment (I) and capital (K). This transformation takes place in (1) **the markets for financial capital** and through (2) **the activities of financial of institutions**.
13. **Financial markets**: The collection of households, firms, governments, banks, and other financial institutions that lend and borrow financial funds. Saving (S) is the sources of the funds that are used to finance investment (I) and these funds are supplied and demanded in three types of financial markets.

**(1) Loan markets**

*Loans are commitments of fixed amount of money for agree-upon periods of time. Loans are borrowing of a sum of money by one person, firm, government or other organization from another.*

- (a) Businesses want short-term loans from a bank to buy equipments or to extend credit to the customers.
- (b) Households want loans from a bank to purchase big ticket items, such as auto, household furnishings and appliances. Most of them also get a loan that is secured by a **mortgage** (*a legal contract that gives ownership of a home to the lender in the event that the borrower fails to meet the agreed loan payment: repayment + interest*).

**(2) Stock market:** A financial market in which shares of companies' stock are traded. (*A stock is a certificate of ownership and claim to the profits that a firm makes.*)

**(3) Bond market:** A financial market in which bonds issued by firms and governments are traded. (*Bond is a promise to pay specified sums of money on specified dates; it is a debt for issuer.*)

**Example:**

A bond is a promise to make specified payments on specified dates. For example, you buy a Wal-Mart 10 year bond with face value \$100 and interest rate  $i = 6.5\%$  in 1/1/99. Wal-Mart promises to pay \$6.5 in 12/31 each year and makes a final payment \$100 + \$6.5 in 12/31/08.

**Note that** the buyer of a bond issued by company or government (federal, state, municipal) makes a loan to the company or government and is entitled to the payment promised by the bond.

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**Types of bonds:**

(1) Corporation bonds; (2) Treasury bonds; (3) State bonds; (4) Municipal bonds; (4) a mortgage-backed security (which entitles its to the income from a package of mortgages).

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14. A financial institution is a **firm** that operates on both sides of the financial markets for financial capital (funds). It is a borrower on one market and a lender in another. *The objective of a financial institution is to make the maximum profits.*

**There are five types of financial institutions.**

**(1) Investment banks:** Investment banks are firms that help company, other financial institutions and governments raise funds by issuing and selling bonds and stocks as well as providing advice on transactions such as mergers and acquisitions. Before summer 2008, five big Wall Street investment firms, Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch, and Morgan Stanley provided investment banking services.

- (2) **Commercial Banks:** The bank, like BoA, Well-Fargo, City Bank, Chase, that we use for our own banking services (we deposit the cash into or withdraw the cash from checking or saving account). The bank also issues our credit card.
- (3) **Government-Sponsored Mortgage Lenders:** Two large financial institutions, the Federal National Mortgage Association (Fannie Mac), and the Federal Home Loan Mortgage Corporation (Freddie Mac), were government-sponsored enterprises that bought mortgage from banks, packaged them into mortgage-backed securities and sold them to the investors. On Sept 7, 2008, they were taken over by the federal government.
- (4) **Pension Funds:** Pension funds use the pension contributions of firms and workers to buy bonds, stocks and mortgage-backed securities.
- (5) **Insurance Companies:** Insurance companies provide risk-sharing services. Insurance companies use the funds they received but not paid out as claims to buy bonds and other financial assets.

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15. A financial institution may face (a) **insolvency**, and (b) **illiquidity** problems.
- (a) **Insolvency:** a financial institution's net worth = (the total market value of what it has lent) – (the total market value of what it has borrowed). If net worth > 0 (< 0), the institution is solvent (insolvent). If the institution will go out of business and stockholders bear the loss.
- (b) **Illiquidity:** An institution makes long-term loans with borrows short-term funds. It will face “illiquidity” if a sudden demand to repay more of what it has borrowed than its available cash.

**Note that** “insolvency” and “illiquidity” were at the core of the financial meltdown of 2007-2008.

#### 16. **Interest rate (i) and asset prices.**

- (a) The interest rate (i) on a financial asset (stock, bond, short-term security and loan) is the **interest** received expressed as a percentage of the price of the asset. For example, in Sept 2009, the price of Microsoft share was \$25 and each share entitled its owner to \$0.5. Thus, the interest rate of Microsoft stock (i) =  $(0.50/25) \times 100\% = 2\%$ .
- (b) **The relationship between an asset price and the interest rate (i) is negative.** That is, if the asset price rises (falls), other things remaining the same, the interest rate falls (rises). For example, if the price of Microsoft stock increased to \$50 and each share still entitled its owner \$0.5, the interest rate (i) =  $(0.50/50) \times 100\% = 1\%$ .

### **The Market for Loanable Funds**

In Macroeconomics, we group all the financial markets into a single market for loanable funds. The loanable funds are money which is available for lending to households, firms government and institutions. The market for loanable funds is the aggregate of the markets for loans, bonds, stocks.

17. The flows of loanable funds come from three sources: (1) **household saving**; (2) **government budget surplus**; (3) **borrowing from the rest of the world**. This can be seen from the national account.

Recall in chapter 5, the aggregate expenditure = aggregate income, i.e.,

$$(a) \quad Y = C + I + G + (X - M)$$

Households income,  $Y$ , is spent on consumption ( $C$ ), saving ( $S$ ) and net taxes ( $T$ ), i.e.,

$$(b) \quad Y = C + S + T \rightarrow C = Y - S - T$$

where  $T$  = taxes paid to government – the cash transfer received from governments (such as social security and unemployment benefits).

Substituting  $C = Y - S - T$  into (a), we obtain

$$(c) \quad I = S + (T - G) + (M - X)$$

where

Households saving:  $S$

Government budget surplus (deficit):  $(T - G) > (<) 0$

Trade deficit (surplus):  $(M - X) > (<) 0$

18.

$S + (T - G)$  = private saving + government saving = national saving.

National saving + borrowing from the rest of the world =  $S + (T - G) + (M - X)$  = the flow of funds that finance investment ( $I$ ).

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#### **Example:**

2008, in US,  $I = 2063$  billion. This comes from the following flow of funds.

$S = 2,045$  billion,  $(T - G) = -707$  billion, and  $(M - X) = 718$  billion.

The flow of funds that finance the investment ( $I$ ) =  $2,045 - 707 + 718 = 2063$ .

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#### **Economic Model: Loanable Funds Market**

**Assume that  $\pi = 0$  and  $i = r$  (nominal interest = real interest)**

19. **Demand for loanable funds (DLF):** The **negative** relationship between the quantity of loanable funds demanded ( $Q_d$ ) and the real interest rate ( $r$ ) when other things remaining the same during a given time period.

$Q_d = Q_d(r; \text{the expected rate of profit, technology})$ .

(a) A change in the real interest rate ( $r$ ), other things remaining the same, there is a movement along DLF curve.

(b) An increase (decrease) in the expected rate of profit or technology shifts DLF rightward (leftward).

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**Nominal interest rate ( $i$ )** is the number of dollar that a borrower pays and a lender receives in interest in a year expressed as a percentage of the number of dollars borrowed or lent. For example, if we deposit \$100 in a saving account in 1/1/08, with  $i = 10\%$ , we will have, interest ( $\$100 \times 0.1 = \$10$ ) + deposit ( $\$100$ ) =  $\$110$ , in our account in 12/31/08.

**Real interest rate** ( $r$ ) is the nominal interest rate ( $i$ ) adjusted to remove the effects of inflation on the buying power of money. Suppose that from 1/1/08 to 12/31/08 the inflation rate is  $\pi = 10\%$ . We need \$110 to buy what a year earlier cost \$100. So  $r = i - \pi = 10\% - 10\% = 0$ .

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**20. Supply of loanable funds (SLF):** The **positive** relationship between the quantity of loanable funds supplied ( $Q_s$ ) and the real interest rate ( $r$ ) when other things remaining the same during a given time period.

$$Q_s = Q_s(r, Y_d, \text{exp } Y_d, A, \text{default risk}).$$

where  $Y_d$  = disposable income =  $Y - \text{net taxes}$ ,  $A$  = wealth,  $\text{exp } Y_d$  = expected future disposable income.

- A change in  $r$ , other things remaining the same, there is a movement along SLF curve.
- An increase in disposable income ( $Y_d \uparrow$ ), a decrease in wealth ( $A \downarrow$ ) or a decrease in expected future disposable income ( $\text{exp } Y_d \downarrow$ ) or a decrease in default risk will increase SLF and shift SLF rightward  $\rightarrow$  an increase in SLF.
- A decrease in disposable income ( $Y_d \downarrow$ ), an increase in wealth ( $A \uparrow$ ) or an increase in expected future disposable income ( $\text{exp } Y_d \uparrow$ ) or an increase in default risk will decrease SLF and shift SLF leftward  $\rightarrow$  a decrease in SLF.

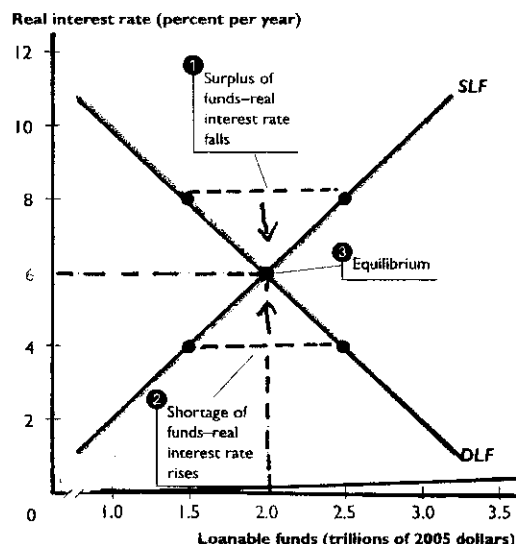
## 21. Equilibrium in the market for loanable funds

### Assumptions

- Other influences remain the same  
DLF: expected rate of profit, technology.  
SLF:  $Y_d$ ,  $A$ ,  $\text{Exp } Y_d$ , default risk.
- Given a time period.
- The laws of DLF and SLF apply.

### Table

$r$ (% per year)	$Q_d$ (trillions of 2000\$)	$Q_s$ (trillions of 2005\$)
10	1.0	3.0
8	1.5	2.5
<b>6</b>	<b>2.0</b>	<b>2.0</b>
4	2.5	1.5
2	3.0	1.0



**Loanable funds market Equilibrium** is a situation where  $Q_d = Q_s$ , i.e., the intersection of DLF and SLF.

- equilibrium real interest rate:**  $r = 6$  where  $Q_d = Q_s = 2.0$ .
- equilibrium quantity of loanable funds:**  $Q_d = Q_s = 2.0$ .

## 22. Changes in Demand and Supply

(1) An increase in demand

**Cause:** expected rate of profit $\uparrow$ , or technology $\uparrow$   $\rightarrow$  DLF $\uparrow$

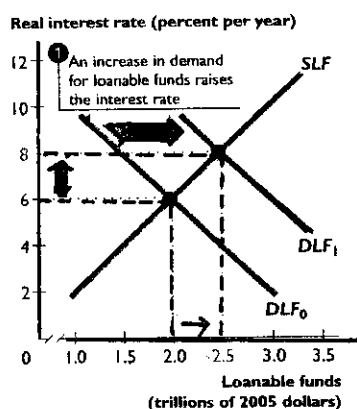
**Effect:**  $r\uparrow$ ,  $Q\uparrow$ .

(2) An increase in supply

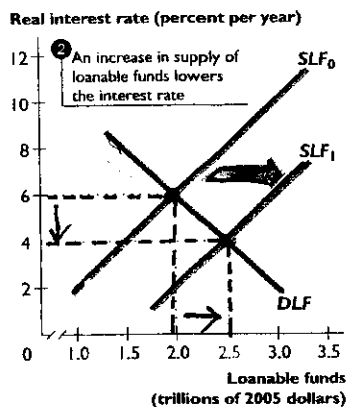
**Cause:**  $Y_d\uparrow$ ,  $A\downarrow$ ,  $ExpY_d\downarrow$ , default risk $\downarrow$   $\rightarrow$  SLF $\uparrow$

**Effect:**  $r\downarrow$ ,  $Q\uparrow$ .

### Changes in Demand and Supply in the Market for Loanable Funds



(a) An increase in investment



(b) An increase in saving

- 1 If the demand for loanable funds increases and the supply of loanable funds remains the same, the real interest rate rises and the equilibrium quantity of funds increases.
- 2 If the supply of loanable funds increases and the demand for loanable funds remains the same, the real interest rate falls and the equilibrium quantity of funds increases.

## 23. Application: Government in the loanable funds market

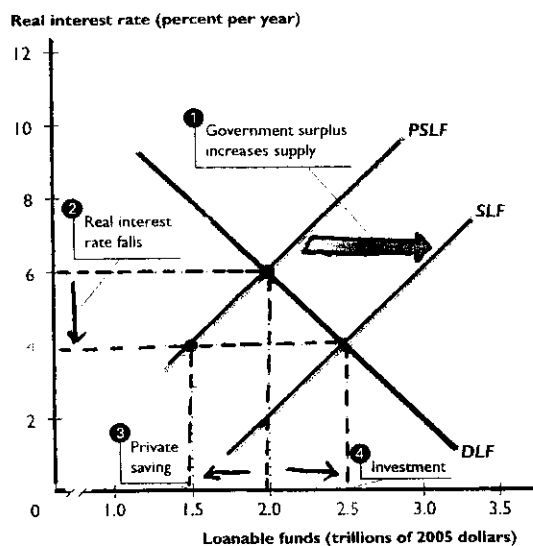
(1) a government budget surplus

**Cause:**  $T - G > 0 \rightarrow$  government saving $\uparrow \rightarrow$  SLF $\uparrow$

**Effect:**  $r\downarrow$ ,  $Q\uparrow$  but the private saving  $\downarrow$  (a down movement along PSLF due to  $r\uparrow$ ).

The demand for loanable funds curve is  $DLF$ , and the private supply of loanable funds curve is  $PSLF$ . With a balanced government budget, the real interest rate is 6 percent a year and investment is \$2 trillion a year. Private saving and investment are \$2 trillion a year.

- 1 A government budget surplus of \$1 trillion is added to private saving to determine the supply of loanable funds curve  $SLF$ .
- 2 The real interest rate falls to 4 percent a year.
- 3 The quantity of private saving decreases to \$1.5 trillion.
- 4 The quantity of loanable funds demanded and investment increase to \$2.5 trillion.



(2) a government budget deficit

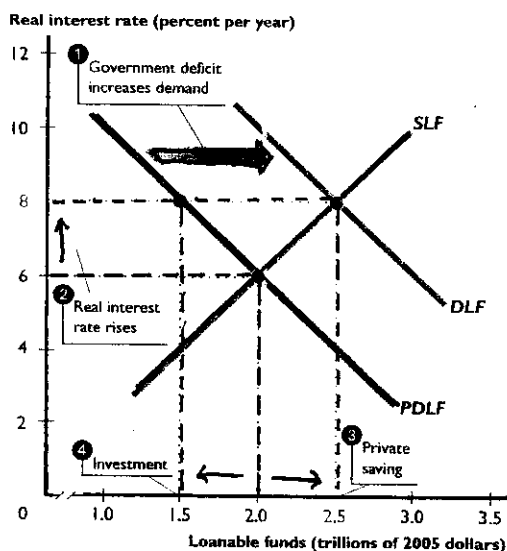
**Cause:**  $T - G < 0 \rightarrow$  government demand for loanable funds  $\uparrow \rightarrow$  it adds to the private demand for loanable funds (PDLF)  $\rightarrow$  DLF  $\uparrow$ .

**Effect:**  $r \uparrow$ ,  $Q \uparrow$  but private investment  $\downarrow$  (an up movement along PDLF due to  $r \uparrow$ ).

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**The crowding-out effect:** The tendency for a government budget deficit to raise real interest rate and decrease investment.

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The supply of loanable funds curve is *SLF* and the private demand for loanable funds curve is *PDLF*. With a balanced government budget, the real interest rate is 6 percent a year and the quantity of loanable funds is \$2 trillion a year. Private saving and investment are \$2 trillion a year.

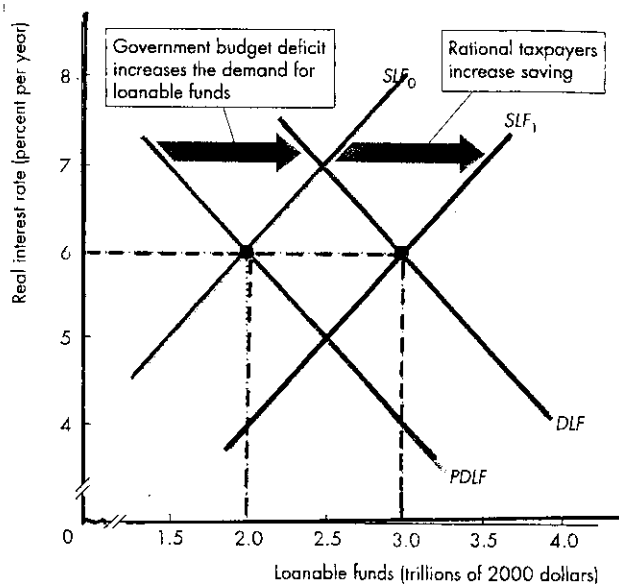
- ① A government budget deficit of \$1 trillion is added to the private demand for funds to determine the demand for loanable funds curve *DLF*.
- ② The real interest rate rises to 8 percent a year.
- ③ The quantity of private fund supplied and the quantity of loanable funds increase to \$2.5 trillion.
- ④ Investment decreases to \$1.5 trillion. Investment is crowded out.

(3) The Ricardo-Barro effect

**Cause:** (a)  $T - G > 0 \rightarrow$  DLF  $\uparrow$

(b) People see a budget deficit today mean that future tax will be higher and future income will be lower, with smaller expected future disposable income  $\rightarrow$  people will save more today  $\rightarrow$  SLF  $\uparrow$ .

**Effect:** Since DLF  $\uparrow =$  SLF  $\uparrow$ ,  $r \rightarrow$ ,  $Q \uparrow$  but private investment remains the same.



A budget deficit increases the demand for loanable funds to *DLF*. Rational taxpayers increase saving, which increases the supply of loanable funds from *SLF*<sub>0</sub> to *SLF*<sub>1</sub>. Crowding out is avoided: Increased saving finances the budget deficit.